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Hill

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[54] **ANCHOR BOLT ASSEMBLY AND UTILIZATION**

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[52] **U.S. Cl.** ..... **61/45 B;** 52/698

[51] **Int. Cl.** **F21d 20/02**

[58] **Field of Search** ..... 61/63, 45 B; 52/698, 704; 85/63, 75

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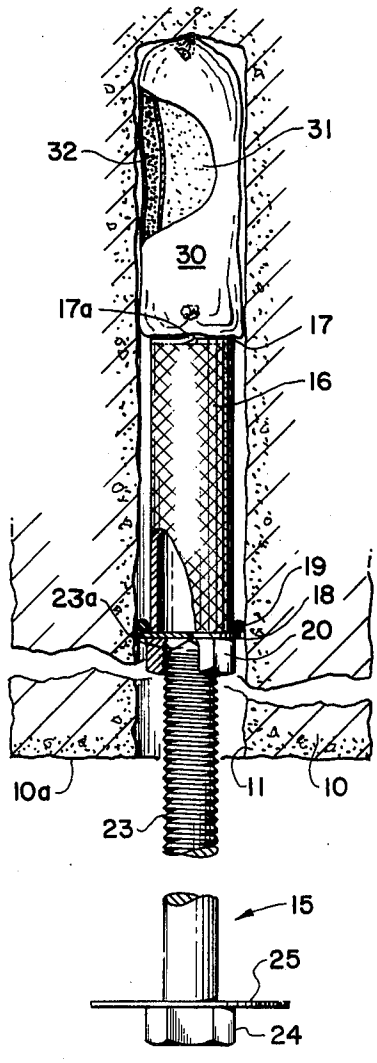
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[57] **ABSTRACT**

A pull-up bolting assembly is constructed to be inserted endwise and rotatably advanced as a unit within a bore hole of a rock-like roof or other structure, with the forward end of the assembly being employed to fracture an in-placed, adhesive resin material containing capsule, and to mix the adhesive material and force it about a hollow pipelike anchor member of the assembly and along the spacing between it and the bore hole. After the adhesive material has set or hardened about the hollow anchor member to non-rotatably fix it in position within a back end portion of the bore hole, a stop means is sheared by a bolt member of the assembly which is then relatively rotatably advanced within a resin-clear, front portion of the bore hole into and along the hollow anchor member until a bearing plate of the assembly is tension-held by the bolt against an outer face of the rock-like structure.

20 Claims, 6 Drawing Figures



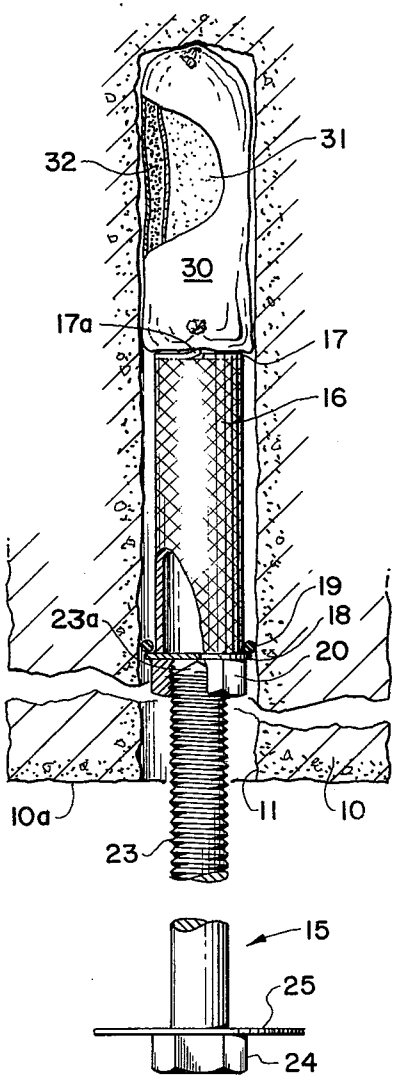


Fig. 1

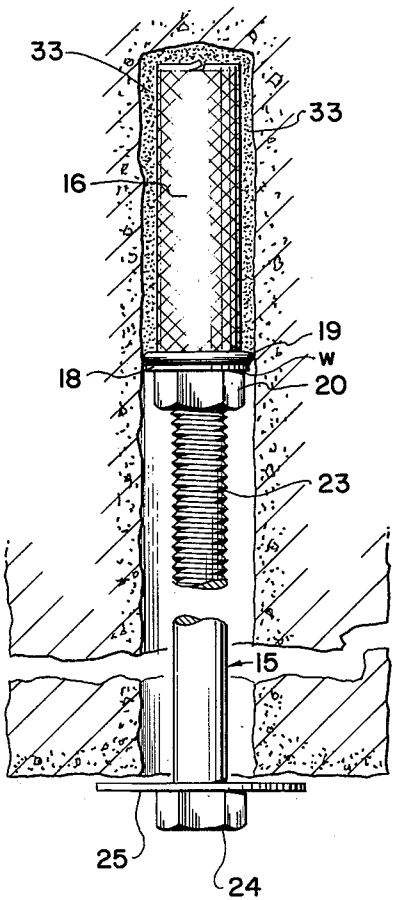


Fig. 2

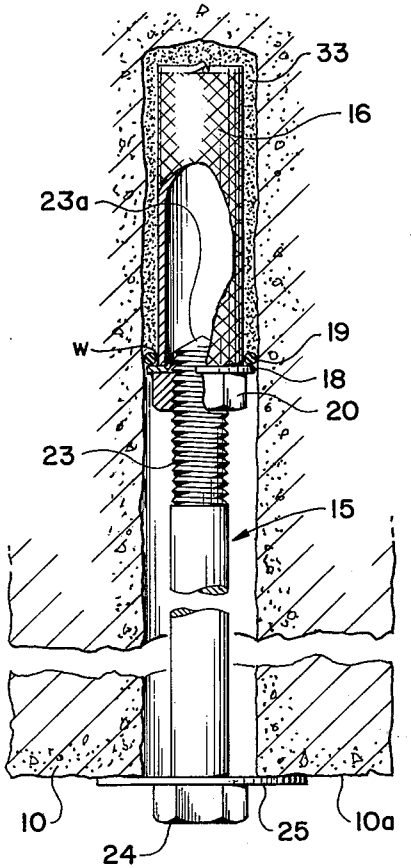


Fig. 3

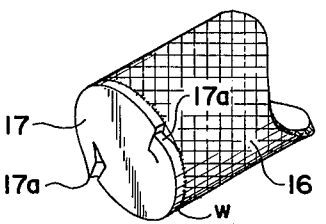


Fig. 4

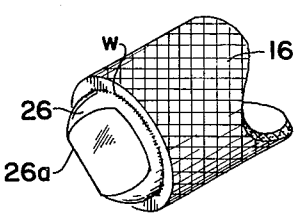


Fig. 5

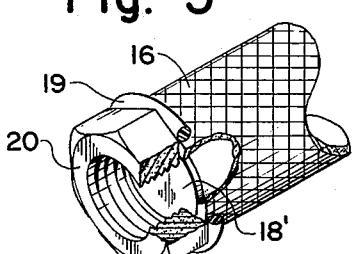


Fig. 6

ANCHOR BOLT ASSEMBLY AND UTILIZATION

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention pertains to a new and improved pull-up bolting assembly which is particularly designed for use in strengthening mine roofs and also, to a bolting assembly that is adapted to effectively utilize a minimized amount of quick setting adhesive, grout or cement within a bore hole that extends from a face of a rock-like structure. A phase of the invention deals with a bolting assembly having means for enabling it to be rotatably endwise introduced into a bore hole as a unit and, after a hollow anchor member of the assembly has been secured therein by an adhesive material, for thereafter utilizing a bolt element of the assembly to finalize its installation as a tensioned unit.

2. Description of the Prior Art

Over the years, two approaches have been made in providing so-called anchor bolts, such as may be used for strengthening roofs in a coal mine, a subway tunnel, etc. An older type of construction employs parts that can be expanded on insertion within a drill or bore hole to provide a mechanical type of expansion gripping action, to thus permit a bolt or screw to be tightened-down against a face of the rock structure. It is important to provide a bolting assembly that will enable a tension pull-up or tightening-down of a bolt and bearing plate assembly under present day Bureau of Mines standards. The Bureau of Mines requires that such a unit be capable of assuring that the installed bolt tension be within a range of 6 to 8,000 pounds.

A second and more recent type of assembly makes use of adhesive or grouting material within and substantially along a drill or bore hole for securing a rod or bolt in place; if a pull-up tensioning is desired, the outer end of the rod or bolt is threaded and provided with a nut and face plate washer. The nut may be tightened-down to, in effect, pull-up the plate against the front face of the structure.

The mechanical type has not been too satisfactory in view of the fact that it requires a relatively strong or more stable type of stratum and many different types of formations are encountered, such as (1) mudstone or siltstone, (2) limestone or massive sandstone, and (3) laminated sandstone or shales. Where adhesive materials have been used for bolt anchorage, bonding strengths have ranged from 1,200 lbs/ linear inch (1¼ inch hole diameter) for (1) above, to 4,000 lbs/inch for (2) and 2,000 lbs/inch for (3). However, difficulty has been encountered in endeavoring to provide a better type that will have a maximum tensile strength in its utilization and without excessive cost. The second or adhesive type has the advantage that the adhesive may be employed to strengthen the particular rock formation as well as to secure the bolt in position therein. However, an assembly of the latter type has been rather expensive and requires considerable amount of adhesive in that the idea has heretofore been to substantially fill the hole about the full length of the rod or bolt member, as positioned to extend substantially along the full length of the drill hole. The drill hole, depending on the type of rock formation or stratum, usually has a depth of about 2 to 5 feet, but in some cases has gone to a depth of about 12 feet.

There has been a need for an improved type of bolting assembly which will make possible a maximized amount of face compression and draw-up tension strength in its installation, and, at the same time, which will be relatively inexpensive from the standpoint of time and materials. As to the cost of installation, it is important to minimize the time required for the setting or hardening of the adhesive material within the drill hole, in order that the bolt tensioning portion of the operation may be quickly accomplished to complete the installation. The present invention makes possible the employment of an assembly of the second type that can be provided and installed at a relatively low cost, with a maximized economy as to the adhesive, and that will have an essential strength in installation.

SUMMARY OF THE INVENTION

It has thus been an object of the present invention to devise a new and improved type of pull-up bolting assembly that may be used for mine roof and other installations wherein a strong and stable structure may be attained.

Another object of the invention has been to evaluate the factors involved and devise a new approach to the fixing of a bolting assembly within a rock-like structure.

A further object has been to devise new procedure in roof strengthening and in rock-like formation securing which will enable a material saving of cost.

A still further object has been to devise a bolting assembly which will minimize quantity requirements for an adhesive material, will enable the use of the adhesive material in such a manner as to minimize the time element in effecting its curing, setting or hardening, and will enable an effective relative movement between parts of the assembly when an inner part has been secured in position by the adhesive and, at the same time, will enable a forwardly advancing rotation of the assembly initially as a unit during its insertion into the bore hole of a rock-like structure.

These and other objects of the invention will appear to those skilled in the art from the illustrated embodiments and the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings,

FIG. 1 is a vertical section in elevation showing the construction of a bolting hole assembly constructed in accordance with the invention, and also showing an initial step in its utilization. In this view, an enclosed sealed-off capsule containing a main body of adhesive resin material and a segregated content of a catalyst, hardening or curing resin material, both in liquid or somewhat viscous form, has been fully inserted into a drill hole; a bolting assembly of the invention has been thereafter inserted into the hole and with its back end in engagement with a forward end of the adhesive capsule, preliminarily to fracturing the capsule for releasing and mixing the materials therein.

FIG. 2 is a view on the scale of and similar to FIG. 1, but showing a second step in a utilization of the assembly of the invention in which a hollow, pipe-like, anchor member has been rotatably advanced within the hole by a unitized, rotative endwise advance of the bolting assembly, with the hollow member being employed to not only fracture the adhesive capsule but to mix its contents and force them as in a mixed condition about and along the full extent of such member.

FIG. 3 is a view similar to and on the scale of FIGS. 1 and 2, illustrating a third step of the operation which

is effected after the adhesive material has set or hardened to secure the hollow anchor member in a non-rotatable fixed position within the bore hole, and a headed bolt is advanced relative to the fixed anchor member by employing an end of its threaded stem to break-through or penetrate a front end wall or closure disc of the hollow anchor member. Thereafter, the bolt is screw-advanced until its bearing plate has been pulled-up into tight abutment with the face of the rock structure and into a covering relation with respect to the hole therein.

FIG. **4** is a slightly enlarged fragmental side perspective view showing details of the construction of a back end wall of the hollow member of the construction which serves as a cutting and mixing means for the adhesive material.

FIG. **5** is a similar view on the scale of FIG. **4**, illustrating a modified type of back end wall having a chisel edge and which may be in the form of a plug-like element or a cap.

And, FIG. **6** is a fragmental side perspective view on the scale of FIGS. **4** and **5** illustrating a preferred simplified construction of the front end of the hollow member.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In carrying out the invention, an adhesive resin capsule, cartridge or sausage **30** is shown, since a quick setting type of resin material can be very effectively utilized. It has been discovered that, contrary to previous ideas, it is not necessary to distribute or provide an adhesive material of a quantity sufficient to substantially fully fill the depth extent of the bore or drill hole and about the bolt assembly employed therein. In accordance with the present invention, the length of adhesive material is proportioned to an amount sufficient to, as shown in FIG. **2**, fill in the spacing between the innermost end of the hole and a back end of and fully along the extent of a hollow, pipe or shell anchor member **16**. The member **16** may be an inexpensive piece of hollow material, such as a length of ordinary steel pipe and is preferably provided with a roughened or cross-hatched outer surface that may be rolled thereon to assure a maximum adherence between it and the adhesive material employed. However, it has been determined that the bond between the resin matrix and bore hole surface is more important than the bond between the resin and the hollow anchoring member.

In evaluating the factors involved in providing an installation that will have sufficient strength, both from the standpoint of tension and compression, it was determined that as little as a 5 inch length of an ordinary steel pipe member of about 1 inch in outer diameter, utilized in the manner shown in FIG. **2**, within a bore hole **11** of about 1¼ inches in diameter, will provide a holding strength of at least about 22,000 lbs. in a limestone or massive sandstone structure. The amount of adhesive resin material may be minimized for each type of stratum or strata structure, and the time required in curing, setting or effecting a hardening of the material may be minimized to effect a material saving in the overall cost of each installation. For example, using a quick-setting resin material **30**, such as a polyester, and employing the bolt construction **15** illustrated, it is now possible to make a complete installation within 1 minute from the time of the initial insertion of the bolting assembly as a unit within a bore or drill hole **11**. The mixing, setting or hardening of the mixed resin material involves a matter of a few seconds.

Using a 1¼ to 1⅜ inch bore or drill hole diameter and a 1 to 1⅛ outer diameter of pipe member **16**, successful use has been made of pipe member lengths of about 6 to 8 inches. However, it has been determined that about a 6 inch length of anchoring pipe or head member **16** is a good average length that provides a full safety margin where the unit or assembly is to be installed in ordinary rock strata. However, the length may be increased for unstable, soft rock as may be required. By utilizing a short length amount of adhesive material, cartridge or capsule, a saving of about 25 cents per foot of bolt length may be effected with the hardening or setting being accomplished within a matter of about a minute, as distinguished from about 2 minutes, utilizing a full hole-filling length of old type or group of resin cartridges. The strength attained will equal or exceed the strength of the bolt, with a material saving in cost and a 50 percent reduction in installation time.

For very soft shales, a greater length of about 18 to 24 inches may be used, but it has been determined that lengths of 6 to 8 inches are generally sufficient, utilizing an 80,000 psi high tension steel bolt with a diameter of anchor shell of about 1 inch with a 1¼ or 1⅜ inch bore hole. To maximize holding of the anchor pipe member **16**, it may be given a light side blow to form it into a slightly oval or ellipsoid shape.

Referring to the drawings, **10** represents a rock-like wall or support structure which is to be secured together or reinforced and which is provided with a bore or drill hole **11** for receiving a bolting assembly of the invention. The assembly has a forward, somewhat cylindrical, pipe-like hollow member, shell or part **16** that constitutes an anchor for the construction. Opposite open ends of the hollow member **16** are closed-off by back and front end walls **17** and **18**, such as may be provided by small, stamped-out, disc-like parts or pieces of a metal such as steel, that may be electrically resistance or induction welded to the pipe member.

The back end wall **17**, as shown in FIG. **4**, is provided with a pair of upset portions **17***a* along its outer edge that serve as breaking and cutting edges as well as a mixing means for the adhesive resin containing capsule **30**. To save expense, the element or piece **17** may be stamped-out at **17***a* and then secured by weld metal *w* to the back end of the pipe member **16**. The width of each portion **17***a* may substantially conform to the wall thickness of the pipe member **16**, so that a full sealing-off may be easily accomplished by securing the piece **17** in position by a weld *w* over the back end of the associated pipe member. A front metal disc **18** may also be secured by electric resistance or induction welding to the front end of the member **16** to fully close it off.

As shown in FIGS. **1, 2** and **3**, a standard nut **20**, such as a hexagonal nut element, is secured by weld metal *w*, directly on the front face of the front disc or closure wall **18** to project forwardly therefrom. A bolt, bar or rod **15**, headed with a wrench flat, is provided having a stem **23** which is of a length equal to the distance between the front end wall **18** of the pipe member **16** in its in-place secured position of FIG. **2** and the outer face of the drill hole. The stem **23** is threaded at its backwardly extending end portion to turnably or rotatably fit within the nut **20** and to later shear the end wall

18 and advance past the nut into the hollow anchor member 16 (see FIG. 3).

During an initial insertion of the bolting assembly into the drill hole 11, the stem 23 of the bolt 15 has its back end portion 23*a* (see FIG. 1) in tight abutment with the front face of the closure wall or disc member 18. Thus, the entire assembly may be inserted and rotatably advanced endwise as a unit within the drill hole 11, and such rotative inward insertion continued until the bolt head and its bearing plate 25 has made contact with the face of the rock structure 10 thereby preventing further insertion of the assembly as shown in FIG. 2. A pneumatic or other suitable form of power tool may be applied to a head 24 of the bolt 15 for this purpose.

At this time, a short wait of, for example, 60 seconds will enable the material to cure, harden or set about the pipe member 16 to anchor or secure it non-rotatably within the end of the drill hole 11. Thereafter, the bolt 15 is screw or turnably advanced by again applying rotative force to the head 24 to thereby cause a backward end portion 23*a* of the bolt 15 to displace, shear or fracture and penetrate the relatively thin wall thickness of the front disc or end wall member 18. The relative movement of the bolt 15 with respect to the anchored pipe member 16 is continued until, as shown in FIG. 3, the bolt 15 has advanced within the pipe member sufficiently to bring its head 24 into tension to compression-hold its associated bearing plate or enlarged washer 25 against the front face of the rock formation and close-off the bore hole 11.

In FIG. 5, a modified form of back end wall 26 is illustrated which is in the form of a plug that may be electrical induction or resistance-welded at *w* to extend from within the back end of the pipe member 16. The end wall 26 terminates in a central, wedge-shaped edge portion 26*a* centrally to provide a chisel-like cutting and mixing pair of surfaces for the adhesive resin material.

With reference to FIG. 1, a typical adhesive capsule or cartridge 30 consists of a main body of resin material 31 and a segregated supplemental body of a catalyst, curing or hardening resin 32. Both resins are retained in the capsule or cartridge by means of a relatively thin wall resin bag or sausage of any suitable type that is easily ruptured or broken by the rotative advance of the forward end wall 17 or 26 of the shell member 16 which becomes an anchoring part or member when the mixed resin material has hardened or set. The resin material 32 is used for polymerizing, curing and setting the main body of the resin material 31 when they are mixed together and displaced along the bore hole 11 and about the pipe member 16 up to a sealing gasket 19.

In order to conserve the adhesive material, avoid clogging threads of the screw assembly and limit movement of the adhesive to the full extent of the outer periphery of the hollow member 16, the sealing gasket 19, shown of a rubberlike O-ring type, is mounted about the outer periphery of the hollow member 16 adjacent its front end and in seated, forward, position-limited abutment with a radially outwardly extending flange portion of the front end wall 18. The gasket 19 will have a larger diameter than the drill or bore hole 11 such that it is slightly compressed when inserted within the hole.

The requisite length of anchoring shell, pipe or hollow head member 16 may be checked by pull tests to determine its anchorage strength, which need not be more than the minimum breaking load for the bolt 15. A standard mine roof bolt of five/eighths of an inch in diameter will yield at a load between 9,700 to 14,700 lbs. and fail between about 16,200 and 24,600 lbs. Celtite, Inc. of Cleveland, Ohio and DuPont of Wilmington, Del. are two representative companies that are in a position to supply the resin cartridges or capsules, and which can be mixed and cured under rotation of at least 120 r.p.m. within about 60 to 75 seconds where the starting resin temperature is within a range of about 65° to 75° F or at usual mine temperature (of about 68° F). The nut 20 may be a conventional hex nut for a bolt 15 of about five/eighths of an inch in diameter. The length of the bolt-anchor assembly from back end wall 17 to bearing plate 25, ideally, should be equal to or slightly less than the depth of the bore hole. However, the bolt take-up during tensioning will compensate for an under-depth bore hole.

In accordance with the present invention, it has been definitely determined that full length resin encapsulation is not necessary, and depending on the particular rock or roof formation, that, using a sleeve or pipe member, a resin grouting length of about 6 to 8 inches is sufficient. For example, using an anchoring sleeve member 16 having an outer diameter of about 1⅛ inches within a bore hole of about 1⅜ inches, provides a one/eighth of an inch spacing width within which the resin material will provide a matrix layer or encapsulation. Such spacing should preferably be within a range of about one/sixteenth to three/sixteenths of an inch on the side with an optimum of about one/eighth inch. The full strength of the main resin body 31 requires a good or thorough mixing with the catalyst or hardening resin 32. A rotational speed of at least 120 r.p.m. has been found to be satisfactory, although the extremely fast setting resins to be used with this device should be mixed at maximum speed (about 475 r.p.m.). The working face of the average coal mine has been found to have a temperature of about 68° F which requires a total time of mixing-curing of about 60 to 75 seconds.

Although, as above pointed out, a device of the invention is particularly suitable for mine roof usage, it also may be employed in tunnels, and for tieing-together rock-like pieces, such as foundation stone, etc. It enables obtaining the full tensile strength of the bolt, with minimal loss of tension due to subsequent weathering and deformation of the anchor rock, that is competitive with a so-called mechanical expansion type of unit. It eliminates the need for an easily damaged and loose nut on a threaded rod or bolt such as used with a type in which the rod or bolt is, itself, directly resin or grout anchored in place substantially fully along its length extent within a bore hole.

FIG. 6 shows a simplified and optimum construction of the front end of the hollow member 16 in which front metal disc 18′ has a smaller diameter such that it will fit therewithin, and the nut 20 has an effective diameter such that its outer edge portion or at least its corners serve as position-limiting abutment or shoulder means for the gasket 19. This enables a direct welding of the nut 20 on the front end of the hollow member 16. The disc 18′ may be an integral closed, thin end portion of the nut 20 or may be a separate piece welded to the inner wall of the member 16 or to the back end of the nut to serve as a temporary barrier for the end of the bolt 15 during the resin mixing and curing phases. The

disc 18' is penetrated and ruptured when the bolt 15 is later advanced for tensioning.

I claim:

1. A roof bolting assembly for mounting in position within a bore hole of a mine roof that is to be strengthened which comprises, a hollow pipe anchor member of a shorter length than the depth of the bore hole, a destructible capsule that contains quick-setting adhesive resin and catalyst-hardener resin materials for insertion into a back end of the bore hole, a headed bolt having a threaded stem and an associated wide-face bearing plate, front and back closure walls at opposite ends of said anchor member, a threaded nut secured to a front end of said anchor member to rotatably receive a back end of said threaded stem therein, said bolt being initially limited in its positioning within said nut by endwise-abutment of the back end of said stem against said front closure wall, said anchor member and said bolt as assembled in the defined manner being adapted to be endwise-inserted and rotatably advanced within the hole until said back closure wall engages and fractures said capsule and mixes and distributes the resin material content thereof within the bore hole from its back end and forwardly along said anchor member, sealing means carried by said anchor member for preventing the mixed resin material from advancing along the bore hole beyond said front closure wall, said mixed resin material being adapted to quickly set within the bore hole and to thereby non-rotatably secure said anchor member therein, and said stem of said bolt being thereafter adapted to be turned within said nut to fracture and penetrate said front closure wall and advance relative to and within said anchor member until said bolt is drawn-up and tensioned to hold said bearing plate in tight engagement with the front face of the roof about the bore hole therein.

2. A roof bolting assembly as defined in claim 1 wherein said back and front closure wall are separate pieces that are welded to the front and back ends of said anchor member, and said sealing means is a ring-like gasket positioned about said anchor member adjacent to said front closure wall.

3. A roof bolting assembly as defined in claim 1 wherein, said front closure wall is a relatively thin piece of metal that is secured within the front end of said anchor pipe member and that is easily fractured by a backward advance of said bolt within said nut when said anchor member has been secured by the setting of the resin material thereabout within the bore hole.

4. A mine roof bolting assembly as defined in claim 1 wherein said back closure wall has at least one backwardly projecting portion for facilitating fracturing said capsule and the mixing of its resin material content.

5. A mine roof bolting assembly as defined in claim 4 wherein said backwardly projecting portion is a chisel-like edge.

6. A mine roof bolting assembly as defined in claim 1 wherein said back closure wall has a spaced-apart pair of upset projections adjacent its outer periphery that substantially correspond in width to the wall thickness of said anchor member.

7. A roof bolting assembly as defined in claim 1 wherein, said front closure wall is a thin metal disc having a peripheral flange portion projecting beyond the outer periphery of said anchor member to provide a seating shoulder for said sealing means, and said sealing means is a ring-like gasket encircling the outer wall of said anchor member and resting in abutment with said flange portion.

8. A bolting assembly for mounting in position within a bore hole extending inwardly from the face of a rock-like structure such as a mine roof and that is adapted to be secured in position within the bore hole by an adhesive material that has been placed within the bore hole which comprises, a cavity defining longitudinal extending metal anchor member of shorter length than the depth of the bore hole and adapted to be introduced into the bore hole and pressed into the adhesive material and to be thereafter non-rotatably secured in position therein by a hardening of the adhesive material thereabout, a bolt having a threaded stem and an associated washerlike bearing plate that is adapted to rest against the face of front part of the structure to close-off the bore hole therein, a threaded nut centrally secured over the cavity to the front end of said anchor member and adapted to rotatably receive a back end of the threaded stem of said bolt therein, stop means cooperating with said nut for limiting the amount of insertion of the threaded stem therewithin until said anchor member has been secured in position within the bore hole by the adhesive material, said stop means being adapted to be thereafter sheared by a rotational advance of said bolt within said nut into the cavity, so that said bolt can be fully advanced into tension-holding engagement with the face of the structure through the agency of said bearing plate.

9. A bolting assembly as defined in claim 8 wherein said stop means is an end closure disc secured in position between a front end of said anchor member and a back end of said nut.

10. A bolting assembly as defined in claim 9 wherein, said closure disc is a metal member of relatively thin wall construction, said closure disc has a flange portion extending radially outwardly beyond the diameter of said anchor member, and a gasket is positioned on said pipe member against said flange portion for engaging the bore hole and restricting outward flow of the adhesive material to the length of said anchor member.

11. A roof bolting assembly as defined in claim 8 wherein, a ring-like gasket is carried by a front end portion of said anchor member for sealing-off the joint between the bore hole and said member during setting of the adhesive material within the bore hole, the outer surface of said anchor member is roughened to facilitate adherence of the adhesive material thereto, and said anchor member has a usual length from end to end of about 6 to 8 inches and has an outer diameter of about 1 to 1⅝ inches.

12. A roof bolting assembly as defined in claim 8 wherein, said nut is directly secured on a front end portion of said anchor member, said stop means is a closure wall secured over a back end of said nut, said nut has an outer periphery that extends radially beyond the outer periphery of said anchor member, and a ring-like gasket is carried on a front end portion of said anchor member in forwardly limited abutment with the outer periphery of said nut.

13. A method of reinforcing a mine roof having a rock-like construction which comprises, boring an elongated hole into the roof from an outer face thereof; providing a bolting assembly of a pipe-like hollow anchor member having a cross-extending back end wall and a fracturable closed-off front end wall portion, having a nut secured to the front end wall portion and pro-

jecting forwardly therefrom and having a headed bolt carrying a bearing plate and with its threaded end mounted within the nut for endwise abutment with the front end wall; first inserting a quick-setting resin adhesive material contained within a thin skin resin capsule into the inner end of the bore hole, inserting the bolting assembly endwise as non-rotatably unit into the bore hole with the back end wall of the pipe member in engagement with the capsule, rotating the bolting assembly and employing the back end of the anchor member to rupture the skin of the capsule and mix its resin material content, flowing the mixed resin material about and between the outer periphery of the anchor member and the inner periphery of the bore hole and restricting its forward flow to substantially the length of the anchor member during the rotative advance of the bolting assembly, hardening the mixed resin material about the anchor member to nonrotatably secure it within the bore hole, rotatably advancing the bolt by turning it with respect to the anchor member within the nut and fracturing the front end wall portion, and then advancing the bolt within the anchor member and drawing the bearing plate into tight abutment against the outer face of the roof over the bore hole by tightening the bolt under tension within the nut.

14. A method as defined in claim **13** wherein an annular width of spacing within a range of about one-sixteenth to one/eighth of an inch is maintained between the inner diameter of the bore hole and the outer diameter of the anchor member within which the resin material is hardened.

15. An improved anchor bolting assembly for mounting in position within a hole extending from a face of and into a support structure and that is adapted to be secured in position within the hole by an adhesive material placed therein which comprises, a longitudinally extending anchor member adapted to be introduced into the hole and having a back end portion for movement into the adhesive material therein, said anchor member being adapted to be thereafter secured in position by hardening of the adhesive material thereabout, a headed bolt having a threaded stem and carrying a bearing plate member thereon that is adapted to rest against a face of the front part of the structure to close-off the hole therein, threaded nut-like means secured on a front end of said anchor member and adapted to receive a back end of said stem therein, means carried by the front end of said anchor member to initially limit the advance of said stem within said nut-like means when said anchor member is being inserted into the hole and to thereafter fracture under rotational advance of an end portion of said stem within said nut-like means and with respect to said anchor member when said anchor member has been secured in position within the hole by the adhesive material, so that said bolt can be advanced into holding engagement with the face of the support structure through the agency of said bearing plate member.

16. An improved anchor bolting assembly as defined in claim **15** wherein flange means is positioned about a forward end portion of said anchor member and extends radially outwardly beyond the outer periphery of said anchor member.

17. An improved anchor bolting assembly as defined in claim **16** wherein a ring-like gasket is carried on the front end portion of said anchor member in forwardly limited abutment with said flange.

18. An improved anchor bolting assembly for mounting in position within a hole extending from a front face of and into a support structure and that is adapted to be secured within the hole by an adhesive material carried within a destructible capsule that has been placed therein which comprises, a longitudinally extending pipe-like anchor member having means closing-off its back end, a headed bolt having a threaded stem and carrying a bearing plate thereon, threaded nut-like means carried on a front end portion of said anchor member and adapted to rotatably receive a forward end of said stem therein, stop means carried by the front end portion of said anchor member to initially limit turning advance of said stem within said nut-like means and with respect to said anchor member when said anchor member is being inserted within the hole, said closing-off means being adapted to move into pressure engagement with the capsule to fracture it and force the adhesive material along the outer side of the length of said anchor member when said anchor member is introduced into the hole by said threaded stem, said anchor member being adapted to be secured in position within the hole by the adhesive material, and said stop means being adapted to thereafter be displaced under relative rotational backward advancement of said stem within said nut-like means whereby said bearing plate may be moved into holding engagement with the front face of the support structure.

19. An improved anchor bolting assembly as defined in claim **18** wherein means is carried by the front end portion of said anchor member for confining flow of the adhesive material to substantially the length of said anchor member.

20. An improved anchor bolting assembly as defined in claim **19** wherein said closing-off means has means for facilitating penetration of the capsule.

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